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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Inventors:	**Lawrence E. Gibson et al.**	**Examiner:**	**Sandra Nolan**
Application No:	**10/626,252**	**Group Art Unit:**	**1772**
Filing Date:	**July 23, 2003**	**Confirmation No:**	**1022**

Title: FLUID EJECTION CARTRIDGE UTILIZING A TWO-PART EPOXY ADHESIVE

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Commissioner for Patents
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APPELLANTS'/APPLICANTS' OPENING BRIEF ON APPEAL UNDER 37 CFR §41.37

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Sir:

This Brief is submitted in support of the Appeal in the above-identified application.

1. REAL PARTY IN INTEREST

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

2. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative, and Assignee are unaware of any other appeals or interferences which would directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

3. STATUS OF THE CLAIMS

The present application was filed on July 23, 2003, with original claims 1-36. A first Office action was mailed October 21, 2004. Appellants amended claims 1, 22, 30, and 33, and cancelled claim 20 in their response (dated January 21, 2005) to this first Office action. A Final Office action was mailed April 29, 2005. Appellants responded June 24, 2005 to this Final Office action. An Advisory Action was mailed July 07, 2005.

Claims 1-19, and 21-36 stand finally rejected by the Examiner and are being appealed herewith. Claim 20 is cancelled. No claims are withdrawn.

4. STATUS OF AMENDMENTS

A Final Response was filed on June 24, 2005, and was entered by the Examiner in the Advisory Action of July 07, 2005. This response did not amend any claims. No amendments have been made subsequent to the Final Office action dated April 29, 2005.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1, of Appellants invention, is an independent claim directed to a fluid ejection cartridge 100, 200[1] that includes a fluid ejector head 102, 202 mounted to a fluid ejection cartridge body 122, or substrate carrier 222 utilizing a two-part epoxy adhesive 140, 240 as illustrated in Figs. 1 and 2.[2] The two-part adhesive includes a polyglycidyl ether of a polyhydric phenol[3] and a hardener having a 3-aminomethyl-3,5,5-trimethyl-1-cyclohexylamine.[4] The invention utilizes adhesive bead 142, 242 to provide a method of attachment between first adherend 120, 220, i.e. the cartridge body or substrate carrier and second adherend 130, i.e. substrate 132 or silicon die 232.[5] The two-part epoxy adhesive forms bonded structure 106, 206 between opposing surface 136, 236 of second adherend 130, 230 and substrate receiving surface 138, 238 of first adherend 120, 220 where cartridge body 122 and ceramic chip carrier 222 includes substrate carrier portion 126, 226, which includes substrate receiving surface 138, 238.[6] In addition, adhesive bead 142, 242 also provides a fluid seal between substrate 132 or silicon die 232 and cartridge body 122 or substrate carrier 222.[7]

Fluid definition layer 152 or chamber layer 252 forms fluidic chamber 156, 256 around fluid ejector actuator 150, 250, disposed on device surface 135, 235 of substrate 132 or silicon die 232, so that when fluid ejector actuator 150, 252 is activated, fluid is ejected out of bore 158 or nozzle 258, which is located proximate to the fluid ejector actuator.[8] Orifice layer 154 or nozzle layer 254 is formed over the

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[1] Numbers in the 100 range refer to Fig. 1 and those in the 200 range refer to Fig. 2.
[2] Page 4, lines 10-13; Fig. 1, (Also see page 11, line 16 - page 13, line 23; Fig. 2 reference numerals 200, 202, 222, and 240.).
[3] Page 7, line 8.
[4] Page 8, line 19.
[5] Page 4, lines 15-16; Fig. 1, (Also see page 11, line
[6] Page 4, lines 16-20.
[7] Page 4, lines 21-22.
[8] Page 6, lines 22-25.

fluid definition layer or chamber layer (dependent claims 2, 9-10, and 34-35) and may be formed of metal, polymer, glass, or other suitable material such as ceramic.[9] Substrate 132 or silicon die 232 is a silicon integrated circuit including transistors and other logic devices (dependent claims 16, 17 and 36) as well as fluid ejector actuator 150, 250 all formed on the device surface of the substrate.[10] In Fig. 2 substrate carrier 222 is a ceramic chip carrier (dependent claim 13), and substrate 232 is a silicon die. Fluid channels 134, 234 (dependent claim 11) formed in substrate 132 or silicon die 232 provide a fluidic path for fluid in a reservoir (See numeral 362 in Fig. 3) to fill fluidic chamber 156, 256.[11]

Two-part epoxy adhesive 140 includes a first part commonly referred to as the resin having a polyglycidyl ether of a polyhyrdric phenol, and a second part commonly referred to as the hardener having a cycloaliphatic polyamine.[12] The resin is a polyglycidyl ether of a polyhyrdric phenol utilizing bisphenol F as the polyhydric phenol.[13] The cycloaliphatic polyamine, is 3-aminomethyl-3,5,5-trimethyl-1-cyclohexylamine commonly referred to as isophorone diamine.[14]

Claim 33 is an independent claim including means plus function limitations also directed to a fluid ejection cartridge 100, 200 that includes a fluid ejector head 102, 202 mounted to a fluid ejection cartridge body 122, or substrate carrier 222 (means for supporting the substrate) utilizing a two-part epoxy adhesive 140, 240 as illustrated in Figs. 1 and 2.[15] The two-part adhesive (means for adhering) includes a polyglycidyl ether of a polyhydric phenol[16] and a hardener having a 3-aminomethyl-3,5,5-trimethyl-1-cyclohexylamine.[17] The invention utilizes adhesive bead 142, 242

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[9] Page 6, lines 27-29.
[10] Page 5, lines 19-21.
[11] Page 6, lines 25-27.
[12] Page 7, lines 7-10.
[13] Page 8, lines1-2.
[14] Page 8, lines 18-20.
[15] Page 4, lines 10-13; Fig. 1, (Also see page 11, line 16 - page 13, line 23; Fig. 2 reference numerals 200, 202, 222, and 240.).
[16] Page 7, line 8.
[17] Page 8, line 19.

to provide a method of attachment between first adherend 120, 220, i.e. the cartridge body or substrate carrier and second adherend 130, i.e. substrate 132 or silicon die 232.[18] The two-part epoxy adhesive forms bonded structure 106, 206 between opposing surface 136, 236 of second adherend 130, 230 and substrate receiving surface 138, 238 of first adherend 120, 220 where cartridge body 122 and ceramic chip carrier 222 includes substrate carrier portion 126, 226, which includes substrate receiving surface 138, 238.[19] In addition, adhesive bead 142, 242 also provides a fluid seal between substrate 132 or silicon die 232 and cartridge body 122 or substrate carrier 222.[20] The means for ejecting may be any device capable of imparting sufficient energy to the fluid to cause ejection of fluid from chamber 156 such as compressed air actuators, electro-mechanical actuators, or thermal mechanical actuators.[21] In addition, the means for ejecting also includes thermal resistors, piezoelectric, flex-tensional, acoustic, and electrostatic elements.[22]

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

In the Final Office action, claims 1-19 and 21-36 were rejected under 35 U.S.C. §103(a) as being unpatentable over JP 06183000A, abstract only, to Ota et al. ("Ota") in view of U.S. Patent No. 5,229,438 to Ishida et al. ("Ishida").

A. The combination of Ota (06183000A) and Ishida (5,229,438) does not disclose, teach, or suggest all claim limitations of claims 1 and 33.

7. ARGUMENT

Appellants assert that the rejection of claims 1-19 and 21-36 as being obvious under §103 over Ota in view of Ishida is improper.

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[18] Page 4, lines 15-16; Fig. 1, (Also see page 11, line
[19] Page 4, lines 16-20.
[20] Page 4, lines 21-22.
[21] Page 6, lines 19-21, 'Fig. 1.
[22] Page 12, lines 29-33, Fig. 2.

A. The combination of Ota (06183000A) and Ishida (5,229,438) does not disclose, teach, or suggest all claim limitations.

i. Prima Facie Obviousness

In order for the Examiner to establish a *prima facie* case of obviousness, there must be (i) some suggestion or motivation, in the prior art itself, to modify the reference or to combine reference teachings, (ii) a reasonable expectation of success, and (iii) the prior art references must teach or suggest each element of the claims.

The burden of establishing a *prima facie* case of obviousness can only be satisfied by a showing of some objective teaching in the prior art that would lead an individual to combine the relevant teachings of the references. Under Section 103, teachings of references can be combined only if there is some suggestion or incentive to do so. The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art also suggests the desirability of the modification.

The law is "clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."[23]

Appellant's invention, as claimed, is directed to the use of a specific type of two-part adhesive to satisfy two functions with a single adhesive joint, namely to adhere a printhead substrate that includes a fluid ejector disposed thereon to a carrier substrate and to provide a fluid seal between these two adherends forming a portion of a fluid ejection cartridge. It is Appellant's belief that the Examiner has

[23] In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (citations omitted).

failed to consider the invention as a whole. Rather than ascertaining whether or not the cited reference teaching would appear to be sufficient for one of ordinary skill in the art to make the combination, Appellant believes the Examiner is incorrectly construing various elements disclosed in the prior art of record to read on Applicant's claimed invention using Appellant's claimed invention as a template to combine the various elements found in the cited references.[24] Further, as stated in MPEP 2141.02, the Examiner must consider the claimed invention 'as a whole'. Further, the Examiner must consider the prior art in its entirety, as stated in MPEP 2141.02. Distilling an invention down to the "gist" or "thrust" of an invention disregards the requirement of analyzing the subject matter "as a whole."[25]

These errors by the Examiner have resulted in the failure, particularly in the lack of a reasoned argument as required by MPEP §2142,[26] of the Examiner's obligation to perform the duty of establishing a *prima facie* case of obviousness in making a rejection under 35 USC § 103.

ii. Examiner misconstrues elements disclosed in Ota as claimed limitations "a substrate" and "a substrate carrier" in the instant case

The Examiner has rejected claims 1-19 and 21-36 as being obvious over Ota in view of Ishida. In the Advisory action, on page 2 the Examiner indicated that the rejections for obviousness in the Final Office action dated 29 April 2005 are maintained for the reasons of record. In the Final Office action, the Examiner asserted that Ota teaches all of the limitations of independent claims 1 and 33 except that Ota fails to teach isophorone diamine (3-aminomethyl-3,5,5-trimethyl-1-

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[24] *In re Lintner*, 458 F.2d 1013, 173 USPQ 560, 562 (CCPA 1972).

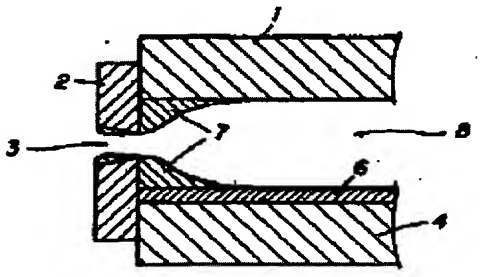
[25] MPEP 2141.02 citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert denied*, 469 U.S. 851 (1984

[26] "When an Appellant submits evidence, whether in the specification as originally filed or in response to a rejection, the Examiner must reconsider the patentability of the claimed invention. The decision on patentability must be based upon consideration of all the evidence, including evidence submitted by the Examiner and evidence submitted by the Appellant . A decision to make or maintain a rejection in the face of all the evidence must show that it was based on the totality of the evidence. Facts established by rebuttal evidence must be evaluated along with the facts on which the conclusion of obviousness was reached, not against the conclusion itself. Citing In re Eli Lilly & Co. , 902 F.2d 943, 14 USPQ.2d 1741 (Fed Cir. 1990).

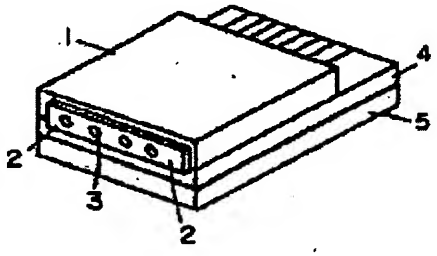
cyclohexylamine) (claim 1 and 33; page 3 of the Final Office action) and amine mixtures (claim 22, page 3 of the Final Office action). In the Advisory action, on page 5 the Examiner clearly is relying on the "gist" or "thrust" of an invention in stating that "the alleged structural differences between the claimed inkjet cartridges and the inkjet heads suggested by the combined references are not persuasive when the basic concept of adhering surfaces with the adhesive compositions recited in the claims is taught/suggested by the combination." Appellants strongly disagree because Ota does not teach all of the other limitations of independent claims 1 and 33.

In the Office action dated 21 October 2004 the Examiner asserted, on page 3 that the Ota abstract teaches ink-jet heads having nozzle plates 2 with nozzles 3, and having channels to from inks cavities 8 where the plates are bound to the channels using a "filler" that contains an epoxy resin and a cyclic aliphatic polyamine as a reactive diluent. The Ota abstract provided by Examiner specifically states nozzle plate "(2) is bonded to the ink channels so that each nozzle corresponds to each ink cavity (8) and [sic] so the opening to discharge the ink drops is formed. A filler 7 is applied to the corner (8) and (2) so that (8) becomes streamlined from the wall of the ink channel to the nozzle," as illustrated below in Figs. 1, 2, and 5 of the Ota patent.

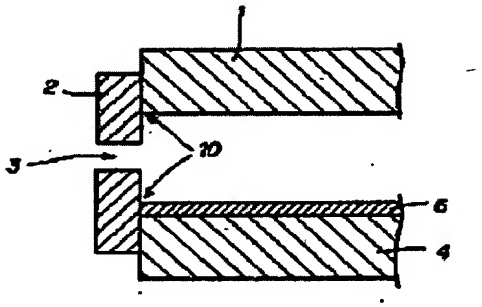
【図１】



【図２】



【図５】



Appellants maintain that the Ota abstract discloses an inkjet head using an epoxy resin containing a cyclic aliphatic polyamine to form an angle filling member between a nozzle plate and a channel plate as well as a cover plate as stated in Appellants response dated 21 January 2005. Appellants believing that the actual prior art reference in its entirety, rather than just an abstract, is preferable in understanding a prior art rejection, obtained a translation of the Ota patent which Appellants maintain, when taken in its entirety[27] shows that Ota clearly discloses an inkjet head formed by attaching a nozzle plate (2) attached to a channel plate (1), a cover plate (6), and a pressure generation member (4), and then forming nozzles in the nozzle plate after attachment of the nozzle plate. Then after formation of the nozzles a filling member (7) that fills an angular part created inside cavity (8) to form a streamlined shape is formed.

Appellants in response to Examiners Final Office action dated 24 June 2005 noted that Examiner in rejecting claim 1 in view of Ota did not identify any structure in Ota as either a substrate or a substrate carrier. Examiner, in the Advisory action, on page 3, states that "the base claims of this case deal with an inkjet head/cartridge that includes two substrates [one of which may be a supportive substrate] that are

[27] A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert denied*, 469 U.S. 851 (1984).

bonded using a two part epoxy adhesive . . . ." Appellants believe that Examiner is improperly changing the wording of, and the nature of the limitations set out in, independent claim 1 to include two substrates one of which *may be supportive* in contradistinction to the claim language of "a substrate carrier having a substrate receiving surface [and] a substrate . . . ." All words in a claim must be considered in judging the patentability of that claim against the prior art.[28] Appellants strongly believe that Ota does disclose a substrate namely pressure generation member 4 and a substrate carrier having a substrate receiving surface namely base plate 5.[29] Although Ota does not disclose much detail about the pressure generating means (i.e. analogous to fluid ejector actuator in the instant specification) Ota at the bottom of page 7 and top of page 8 does refer to PZT or a similar ceramic or silicon based plate. Thus, Appellants believe the pressure generation member 4 includes a substrate within its structure and that cover plate 6 in Ota covers the pressure generating means. In the alternative, although Appellants disagree with such an interpretation, Appellants note that one may construe cover plate 6 as a substrate and pressure generation member 4 may be construed as a substrate carrier having a substrate receiving surface. However, Appellants maintain that to construe nozzle plate 3 as a substrate and the combination of ink channel plate 2, cover plate 6, and pressure generation member 4 all as a single substrate carrier having a substrate receiving surface or even one of the plates or the member separately construed as the substrate carrier, is in effect using Appellants claim language as not only a template to combine the various elements found in the cited reference,[30] but, in addition, is essentially forcing various elements of the prior art that are clearly

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[28] MPEP 2143.03 citing *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

[29] *See* Ota translation page 6 under subtitle (Embodiments) Ota states in "Figures 1 and 2, 1 is an ink channel plate, 2 is a nozzle plate, 3 is a nozzle, 4 is a pressure generation member, 5 is a base plate, 6 is a cover plate, and 7 is and[sic] angle filling member added according to this invention." In addition, Ota continues in paragraph (0008) to state "wherein a nozzle plate 2 is connected so as to create a lid on an ink cavity 8 formed by a channel plate 1 and a cover plate 6 . . . ."

[30] It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fitch*, 972 F.2d 1260, 23 USPQ2d 1780, 1784(Fed. Cir. 1992) (quoting *In re Fine*, citation omitted).

identified and defined and then rewording those elements to fit Appellants claimed invention.

In analogous arguments Appellants believe that Ota does not teach all of the limitations (besides the isphorone diamine) of independent claim 33 written in means plus function language. Namely claim 33 discloses a substrate having means for ejecting a fluid, (e.g. a fluid ejector actuator), means for supporting said substrate, (e.g. fluid ejection cartridge body 122, or substrate carrier 222); and means for adhering (i.e. the two-part adhesive) said substrate to said means for supporting said substrate, wherein said means for adhering includes a two-part epoxy resin adhesive including a hardener having 3-aminomethyl-3,5,5-trimethyl-1-cyclohexylamine. Appellants believe that the arguments for independent claim 1 equally apply to independent claim 33.

In regards to Ishida Examiner has not argued that Ishida discloses any of the fluid ejection cartridge structures claimed in independent claim 1, i.e. "a substrate carrier having a substrate receiving surface," and "a substrate having at least one fluid ejector actuator disposed on said substrate." Appellants agree, since Ishida is directed to an adhesive for adhering to wet mortar and wet concrete. Specifically Appellants assert that Examiner has provided no reasoned argument that establishes that Ota discloses using the claimed adhesive to adhere a substrate having at least one fluid ejector actuator disposed thereon to a substrate receiving surface of a substrate carrier. Thus, Appellants assert that Examiner has not provided a *prima facie* case of obviousness since neither Ota nor Ishida taken individually or in combination discloses, teaches, or suggests Appellants claimed invention as claimed in independent claims 1 and 33. Accordingly, rejection of claims 1-19 and 21-36 over Ota in view of Ishida is improper on the grounds that Ota is silent on the method of attachment of the pressure generation member to the base plate.

iii. Examiner misconstrues an angle filling member formed using an epoxy resin disclosed in Ota as the claimed limitation "a two-part adhesive" in the instant case

As previously noted above in the Office action dated 21 October 2004 the Examiner asserted, on page 3, that the Ota abstract teaches ink-jet heads where the plates are bound to the channels using a "filler" that contains an epoxy resin and a cyclic aliphatic polyamine as a reactive diluent. Examiner also asserted, on page 3, that "[t]he 'filler' is deemed to be an adhesive because it helps seal the plates to the channel-forming structures 1 (Figure 1)." In the Advisory action, on page 3, Examiner further asserted that "Ota teaches an inkjet head (title) that employs a two-part epoxy resin as an 'angle filling member' (see pars. 0012 and 0013, on pages 7 and 8, respectively, of the translation supplied with the last response) 'in the part joining the ink channel and the nozzle plate' (see last two lines of '(Claim 1)', at page 2 of the translation. [emphasis added.]. The examiner interprets "joining" to mean adhering." Appellants strongly disagree with Examiners assertions because when read in its entirety Ota does not teach a two-part adhesive disposed between said substrate and said substrate receiving surface as claimed in independent claim 1 and 33.

Appellants agree with Examiner that Ota teaches an inkjet head (title) that employs a two-part epoxy resin as an 'angle filling member' (see pars. 0012 and 0013, on pages 7 and 8, of the translation). Appellants disagree with Examiner that "filler" may be deemed an adhesive because it helps seal the plates to the channel-forming structures 1. Appellants disagree with Examiner that "filler" or angle filling member 7 provides any sealing functionality. Appellants have been unable to find any reference within Ota that refers to angle filling member 7 sealing any portion of the inkjet head. In addition, Appellants disagree with Examiner that "filler" may be deemed an adhesive and that the term "joining" can be arbitrarily construed as adhering without looking to the teachings of Ota in its entirety. Appellants believe

that Examiner cannot simply take that definition which is most convenient for asserting an obvious rejection and ignore those teachings that lead to a different meaning. Appellants agree with Examiner that joining may mean adhering or mounting; however, in regards to Ota, Appellants assert that joining refers to the angular part (i.e. portion) of where the nozzle plate meets the channel plate or the cover plate.[31] Appellants believe that such a meaning is consistent with the teachings of Ota in its entirety. Appellants assert that Examiner in citing the language in claim 1 "an angle filling member, which serves to eliminate an angular part crated[sic] inside said cavity in the part *joining* said ink channel with said nozzle plate," clearly uses joining to refer to the relationship of the two plates at the point the plates meet and does not refer to adhering.[32] *Emphasis added.*

Further, Paragraph (0008) of Ota on page 6 of the translation states that "a nozzle plate 2 is connected so as to create a lid on ink cavity 8 formed by channel plate 1 and cover plate 6, while the nozzles are formed by irradiation with high-energy beams. . . ." That is Appellants assert a blank nozzle plate is attached in some manner not described by Ota before nozzles 3 are formed and before angle filling member 7 is generated. Appellants agree that nozzle plate 2 may be adhesively joined to the channel plate 1, cover plate 6, pressure generation member 4; however, Appellants also note that nozzle plate 2 may be mechanically attached as well, and that Ota does not explicitly state how nozzle plate 2 is attached except in an alternative method described in paragraph (0014) at the bottom of page 8. In paragraph (0014) Ota states "another method that can be used for the formation of the angle filling member 7, the nozzle plate 2 is coated with a resin in a suitable thickness having adhesive characteristics, whose adhesiveness has been adjusted ahead of time to a relatively low level . . . so that the angle filling member is formed

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[31] Such a meaning is further confirmed in paragraph 10 where Ota states that "an angular part 10 is created for channel plate 1 and nozzle plate 2 as shown in" figure 5.

[32] This interpretation is further strengthened if one looks to claim 6 which states "said ink channels are joined so as to correspond to each of the nozzle in the ink cavity; wherein when an ink cavity is filled with a fluid resin, next while gas is supplied from the side of the ink cavity and passes through nozzle until it is discharged . . . ." Where clearly Ota uses the term joined to mean attach or adhere prior to formation of the angular part.

with a protruding adhesive resin *together with the joining of the nozzle plate.*" Emphasis added. Thus, the one time Ota explicitly states that the nozzle plate may be coated with the epoxy resin disclosed in Ota before attachment, Ota specifically notes that the adhesiveness is adjusted to be relatively low. In addition, Appellants believe the wording *together with the joining of the nozzle plate* implies that some other means is being used to attach the nozzle plate to the channel plate, cover plate, and pressure generation member. Therefore Appellants assert that the adhesive characteristics of the resin used to form the angle filling member are not dominant and if anything are minimized in favor of forming a streamlined structure, i.e. using the two-part epoxy as a flowable material to create a particular desired structure or shape that does not require the flowable material to function as an adhesive. Appellants assert that whether or not the two-part epoxy of Ota is an adhesive is not germane to its use as disclosed in Ota and therefore does not read on independent claims 1 and 33 claiming "a two-part adhesive disposed between said substrate and said substrate receiving surface," and "means for adhering said substrate to said means for supporting said substrate, wherein said means for adhering includes a two-part epoxy resin adhesive," respectively.

In addition, Ota, in Paragraph (0008), also states "the nozzles are formed . . . from the outer side of the ink cavity, so as to correspond to each ink cavity 8. The diameter of the formed nozzle is greater than the diameter of the inner part of the ink cavity . . . ." Appellants note that if one looks carefully at Fig. 1 one notes that nozzle 3 near the end of the lead line also contains the same cross-hatching as that shown for angle filling member 7 indicating that the epoxy resin used flows through the nozzle further confirming that angle filling member is formed after nozzle plate 2 is attached, which is consistent with the description in Ota of the formation of the angle filling member at the end of paragraph (0006).[33] Appellants believe that these arguments for independent claim 1 equally apply to independent claim 33 since the

[33] Ota states "while a fluid resin fills the inner part of the ink cavity . . . [and] while air passes from the side of the ink cavity and is discharged to atmospheric air, the angular part inside the cavity of part connecting said ink channel with said nozzle plate is filled with said fluid resin."

means for adhering is the two-part adhesive and the means for supporting the substrate includes the substrate carrier or fluid ejection cartridge body.

Specifically Appellants assert that Examiner has provided no reasoned argument that establishes that Ota discloses using the epoxy resin disclosed in Ota to adhere a substrate having at least one fluid ejector actuator disposed thereon to a substrate receiving surface of a substrate carrier. Thus, Appellants assert that Examiner has not provided a *prima facie* case of obviousness since neither Ota nor Ishida taken individually or in combination discloses, teaches, or suggests Appellants claimed invention as claimed in independent claims 1 and 33. Accordingly, rejection of claims 1-19 and 21-36 over Ota in view of Ishida is improper on the grounds that the resin disclosed in Ota is not used as an adhesive but rather as a resin to form an angle filling member.

iv. Summary of Section A

Appellants assert that the Examiner has not established the *prima facie* obviousness of claims 1-19 and 21-36, because Ota is silent on the method of attachment of pressure generation member to the base plate and separately because the resin disclosed in Ota is not used as an adhesive but rather as a resin to form an angle filling member. Therefore neither Ota nor Ishida taken individually or in combination discloses, teaches, or suggests Appellants claimed invention as claimed in independent claims 1 and 33. Accordingly, rejection of claims 1-19 and 21-36 over Ota in view of Ishida is improper.

Conclusion

The Examiner erred in failing to establish a case of *prima facie* obviousness in rejecting claims 1-19 and 21-36 as obvious over Ota alone or in combination with Ishida. Appellants respectfully request reversal of these rejections from the Board of Patent Appeals and Interferences, along with timely issuance of a notice of allowance indicating that claims 35-45 and 52 are allowed.

Appellant will defer his decision as to whether or not to request oral argument until after receipt of the Examiner's Answer to this Appeal Brief.

Respectfully submitted,
Lawrence E. Gibson et al.

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8. Claims Appendix

1. (previously presented) A fluid ejection cartridge, comprising:

a substrate carrier having a substrate receiving surface;

a substrate having at least one fluid ejector actuator disposed on said substrate; and

a two-part adhesive disposed between said substrate and said substrate receiving surface, wherein said two-part adhesive comprises:

an epoxy resin having a polyglycidyl ether of a polyhydric phenol; and

a hardener having 3-aminomethyl-3,5,5-trimethyl-1-cyclohexylamine.

2. (Original) The fluid ejection cartridge in accordance with claim 1, further comprising at least one nozzle proximate to said at least one fluid ejector actuator disposed over said substrate.

3. (Original) The fluid ejection cartridge in accordance with claim 2, wherein said fluid ejector actuator further comprises a fluid energy generating element.

4. (Original) The fluid ejection cartridge in accordance with claim 3, wherein activation of said fluid energy generating element ejects essentially a drop of a fluid from said at least one nozzle, and the volume of the fluid, of essentially said drop, is in the range of from about 5 femto-liters to about a 900 pico-liters.

5. (Original) The fluid ejection cartridge in accordance with claim 4, wherein said fluid energy generating element is a thermal resistor.

6. (Original) The fluid ejection cartridge in accordance with claim 4, wherein said fluid energy generating element is a piezoelectric actuator.

7. (Original) The fluid ejection cartridge in accordance with claim 4, wherein said fluid energy generating element is a acoustic actuator.

8. (Original) The fluid ejection cartridge in accordance with claim 1, further comprising a reservoir fluidically coupled to said at least one fluid ejector actuator.

9. (Original) The fluid ejection cartridge in accordance with claim 1, further comprising a fluid definition layer.

10. (Original) The fluid ejection cartridge in accordance with claim 9, wherein said fluid definition layer further comprises:

a chamber layer defining sidewalls of a chamber; and

an orifice layer defining a bore.

11. (Original) The fluid ejection cartridge in accordance with claim 10, further comprising fluid inlet channels formed in said substrate and fluidically coupled to said chamber.

12. (Original) The fluid ejection cartridge in accordance with claim 1, further comprising a cartridge body coupled to said substrate carrier.

13. (Original) The fluid ejection cartridge in accordance with claim 1, wherein said substrate carrier further comprises a ceramic chip carrier.

14. (Original) The fluid ejection cartridge in accordance with claim 1, further comprising a reservoir fluidically coupled to said substrate.

15. (Original) The fluid ejection cartridge in accordance with claim 1, wherein said fluid reservoir contains an ejectable fluid fluidically coupled to at least one nozzle.

16. (Original) The fluid ejection cartridge in accordance with claim 1, further comprising:

at least one active device disposed on said substrate; and

an electrical trace electrically coupling said at least one active device to said at least one fluid ejector actuator.

17. (Original) The fluid ejection cartridge in accordance with claim 16, wherein said active device further comprises a transistor.

18. (Original) The fluid ejection cartridge in accordance with claim 1, wherein said polyglycidyl ether of a polyhydric phenol is a glycidyl ether of bisphenol A.

19. (Original) The fluid ejection cartridge in accordance with claim 1, wherein said polyglycidyl ether of a polyhydric phenol is a glycidyl ether of bisphenol F.

20. (Canceled)

21. (Original) The fluid ejection cartridge in accordance with claim 1, wherein said epoxy resin further comprises a resin selected from the group consisting of a bisphenol type epoxy resin, an epoxy novolac resin, an epoxy phenolic novolac resin, a cresol glycidyl ether, an aliphatic glycidyl ether having C8 to C18 alkyl groups, an alkyl gylcidyl ether having C4 to C12 alkyl groups, a polypropylene glycol based resin, a 1,4 butanediol diglycidyl ether, triglycidylether of trimethylolpropane, 4-glycidoxy-N,N-diglycidyl aniline, halogenated phenoxy epoxy resins, epoxyalkoxy resins, and mixtures thereof.

22. (previously presented) The fluid ejection cartridge in accordance with claim 1, wherein said hardener further comprises a hardener selected from the group consisting of diethylenetriamine, triethylenetetramine, poly(oxypropylene diamine), poly(oxypropylene triamine), polyglycolamine, m-phenylene diamine, 4,4'-diaminodiphenyl sulfone, 4,4'-diaminodiphenyl methane, N-aminoethylpiperazine, 1,2-diaminocyclohexane, 1,3-diaminocyclohexane, 1,4-diamino-3,6-diethylcyclohexane, 2,2-di(4-aminocylcohexyl) propane, di(4-aminocyclhexyl) methane, and mixtures thereof.

23. (Original) The fluid ejection cartridge in accordance with claim 1, wherein said two-part adhesive further comprises a thixotrope.

24. (Original) The fluid ejection cartridge in accordance with claim 23, wherein said thixotrope is selected from the group consisting of fumed silicas, clays, nanoclays, talcs, calcium carbonates, and mixtures thereof.

25. (Original) The fluid ejection cartridge in accordance with claim 1, wherein said two-part adhesive further comprises a silane coupling agent.

26. (Original) The fluid ejection cartridge in accordance with claim 25, wherein said silane coupling agent is in the range from about 0.2 weight percent to about 2.0 weight percent.

27. (Original) The fluid ejection cartridge in accordance with claim 1, wherein said two-part adhesive further comprises a filler.

28. (Original) The fluid ejection cartridge in accordance with claim 27, wherein said filler is added to adjust a mix volume ratio of said epoxy resin and said hardener in the range from about 4 to about 1.

29. (Original) The fluid ejection cartridge in accordance with claim 27, wherein said filler is added to adjust a mix volume ratio of said epoxy resin and said hardener in the range from about 1:1 to about 10:1.

30. (previously presented) The fluid ejection cartridge in accordance with claim 27, wherein said filler is selected from the group consisting of glass spheres, low density glass spheres, ceramic spheres, polymer spheres, barium sulfate, barium titanate, silicon oxide powder, amorphous silica, talc, clay, mica powder, and mixtures thereof.

31. (Original) The fluid ejection cartridge in accordance with claim 1, wherein said two-part adhesive further comprises a pigment providing visual reference of proper mixing of said epoxy resin and said hardener.

32. (Original) The fluid ejection cartridge in accordance with claim 31, wherein said pigment is in the range from about 0.005 weight percent to about 1 weight percent.

33. (previously presented) A fluid ejection cartridge, comprising:
a substrate having means for ejecting a fluid;
means for supporting said substrate; and
means for adhering said substrate to said means for supporting said substrate, wherein said means for adhering includes a two-part epoxy resin adhesive including a hardener having 3-aminomethyl-3,5,5-trimethyl-1-cyclohexylamine.

34. (Original) The fluid ejection cartridge in accordance with claim 33, wherein said means for ejecting said fluid further comprises means for ejecting essentially a drop of said fluid, and the volume of said fluid is in the range of from about 5 femto-liters to about 900 pico-liters.

35. (Original) The fluid ejection cartridge in accordance with claim 33, further comprising:

means for forming a chamber; and

means for forming a nozzle.

36. (Original) The fluid ejection cartridge in accordance with claim 33, further comprising means for performing logic on said substrate.

9. Evidence Appendix

Appellants submitted this English translation in Appellants response dated 24 June 2005 and Examiner on page 2 of the Advisory action dated 7 July 2005

(19) JAPANESE PATENT OFFICE (JP)

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(54) Title of the Invention: INKJET HEAD AND MANUFACTURE THEREOF

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(54) (Title of the Invention): Inkjet Head and Manufacture Thereof

(57) Summary

(Goal)

The goal is to provide an inkjet head and a manufacturing method for an inkjet head characterized by precision and a high reliability.

(Construction)

The construction comprises a nozzle plate 2, having one or several nozzles deployed opposite a recording medium, one or several channels forming an ink cavity 8, and a pressure generating means generating pressure in order to eject ink droplets; wherein said nozzle plate 2 and ink channel(s) are connected in such a way so that each nozzle 3 is located opposite an ink cavity 9, forming an ink ejection outlet. The angular part of the part connecting said ink channel and said nozzle plate is filled with an angle filling member 7 created in order to eliminate the angle.

[see Figure]

[page 2]

(Scope of the Patent's Claims)

(Claim 1)

An inkjet head, characterized by the fact that it is provided with a nozzle plate having one or multiple nozzles arranged opposite a recording medium;

having one ore several channels, which serve to form an ink cavity;

and a pressure generation means, which serves to generate pressure to eject ink droplets;

in an inkjet head forming an ink droplet ejection outlet, wherein said nozzle plate and said ink channels are joined so as to correspond to each of the nozzles in the ink cavity;

and an angle filling member, which serves to eliminate an angular part crated inside said cavity in the part joining said ink channel with said nozzle plate.

(Claim 2)

The inkjet head described in claim 1, characterized by the fact that said angle filling member is created with a shape enabling to create a streamline shape of the ink cavity from the wall surface of the ink channel to the nozzle.

(Claim 3)

The inkjet head described in claim 1 or claim 2, characterized by the fact that said angle filling member is an epoxy-based resin.

(Claim 4)

The inkjet head described in claim 3, characterized by the fact that said epoxy-based resin is a two-component liquid epoxy resin hardening at normal (or medium) temperature.

(Claim 5)

The inkjet head described in claim 3, characterized by the fact that a reactive diluent is added to said epoxy-based resin.

(Claim 6)

Inkjet head manufacturing method, characterized by the fact that it is provided with a nozzle plate having one or multiple nozzles arranged opposite a recording medium;

one ore several channels, which serve to form an ink cavity;

and a pressure generation means, which serves to generate pressure to eject ink droplets;

in an inkjet head forming an ink droplet ejection outlet, wherein said nozzle plate and said ink channels are joined so as to correspond to each of the nozzle in the ink cavity;

wherein when an ink cavity is filled with a fluid resin, next, while gas is supplied from the side of the ink cavity and passes through nozzle until it is discharged when external air is reached, said resin having fluid characteristics is formed in the angular part inside the cavity joining said ink channel with said nozzle plate.

(Claim 7)

The inkjet head manufacturing method of claim 6, characterized by the fact that the gas flowing during the formation of said fluid resin channel is a heating gas.

(Detailed Explanation of the Invention)

(0001)

(Sphere of Industrial Use)

This invention relates to an inkjet head deployed in an inkjet recording apparatus, more specifically it relates to an inkjet head and a method to manufacture an inkjet head which has a superior high-frequency responsiveness.

(0002)

(Prior Art Technology)

In order to ensure a stable and high print quality of inkjet heads provided with a superior high frequency responsiveness, the inner part of the inkjet cavity is completely filled with ink during certain operations and when energy is applied to achieve ejection of ink droplets, operations are required so as to eject ink droplets without losing this energy. However, since there is a possibility that an air bubble will be drawn in when reaction negative pressure is generated immediately after the ejection of an ink droplet, the representative commercial product designs listed below were employed according to prior art as a measure preventing drawing in of air bubbles.

(0003)

(1) A member, such as a channel plate forming an inkjet cavity, is deployed so as to restrict gradually the part in the vicinity of the nozzle part with injection molding or a similar type of processing which is used to create a taper shape facing the nozzle.

(2) When nozzles are formed in a nozzle plate, high-energy beams are utilized, for example with excimer laser or the like, to create a taper shape of the nozzle unit itself.

(3) The wettability is increased with metal plating of the nozzle plate in which nozzles are formed and a thin ink film is formed in a part in the vicinity of the nozzles of the nozzle plate.

(4) The nozzle holes are formed with a punch and a die (for example Japanese Japanese Unexamined (Kokai) Patent Application No. 4-39053).

(0004)

(Goal to Be Achieved By This Invention)

However, the methods mentioned above suffer from the following drawbacks.

(1) High-precision processing on the order of several μm is required to create a restricting part which is used to restrict a channel plate or the like with a restricting member.

(2) When holes are created in a plate by using high-energy beams, for example with excimer laser processing, the diameter of the hole on the surface affected by the laser beams is normally greater than the diameter of the hole on the reverse surface through which the beams are passing.

Accordingly, after the main head unit has been attached to the nozzle plate, a hole corresponding to the ink cavity forming the liquid channel is formed with this processing method and because a reversed taper shape is formed in the direction opposite to the direction of ink ejection, it is not possible to perform stable ejection of ink droplets with this design. In addition, when the method using a technique creating holes is applied to a nozzle plate with the method described above, after the holes have been formed, an alignment corresponding to the body cavity is required, so that complicated operations are created during this stage because contact with the nozzle plate must be achieved.

(3) When a thin film of ink is formed on a nozzle plate, it is difficult to control the amount of the ink required to form a thin film. Moreover, because an ink mist is normally created in locations that are very close to the printed text, poor control can easily exert an influence on the print quality.

(4) The operations are complicated because a burr removing stage is required after the hole-creating stage, together with inspection control.

(0005)

The goal of this invention is to resolve the problem areas described above by providing an inkjet head and an inkjet head manufacturing method which is not only precise, but also highly reliable.

(0006)

[page 3]

(Means to Solve Problems)

In order to achieve the goals of this invention, the invention is characterized by the following: (1) an inkjet head having a nozzle plate provided with one or multiple nozzles arranged opposite a recording medium, having one or several channels forming an ink cavity, and a pressure generation means generating pressure in order to eject ink droplets in an inkjet head, in an inkjet head wherein an ink droplet ejection outlets are formed connected so that said nozzle plate and ink channels are deployed opposite each nozzle and ink cavity;

having a filling member which fills an angular part created inside said cavity of the part connecting said ink channel and said nozzle plate so as to eliminate the angular part;

wherein in this inkjet head: (2) said angle filling member is formed to create a streamlined shape of the ink cavity from the wall face of the ink channel to the nozzle, or

(3) said angle filling member is made from an epoxy-based resin, or

(4) said epoxy-based resin is a hardening type of resin being a two-component liquid epoxy resin hardening at normal temperature(or medium temperature), or

(5) said epoxy-based resin is characterized by an addition of a reactive diluent.

Moreover, (6) the construction is provided with a nozzle plate having one or multiple nozzles arranged opposite a recording medium, one or multiple channels forming an ink cavity, having a pressure generation means generating pressure in order to eject ink droplets according to a manufacturing method, wherein an inkjet head is formed with ink droplet ejection outlets connected so that said nozzle plate and ink channels are deployed opposite each nozzle and ink cavity, while a fluid resin fills the inner part of the ink cavity. Next, while air passes from the side of the ink cavity and is discharged to atmospheric air, the angular part inside the cavity of part connecting said ink channel with said nozzle plate is filled with said fluid resin. In addition, the air used during item (6) is heated air which is circulated during the formation of said fluid resin (7).

(0007)

(Embodiments)

Figure 1. shows an enlarged profile view explaining one embodiment of the inkjet head of the present invention. Figure 2 shows a perspective view of the entire unit of one embodiment of an inkjet head compatible with this invention. In these Figures 1 and 2, 1 is an ink channel plate, 2 is a nozzle plate, 3 is a nozzle, 4 is a pressure generation member, 5 is a base plate, 6 is a cover plate, and 7 is and angle filling member added according to this invention.

(0008)

The inkjet head is shown in Figure 1 and Figure 2 in an enlarged profile view in the vicinity of the nozzle as a profile view in the longitudinal direction of the channel, wherein a nozzle plate 2 is connected so as to create a lid on an ink cavity 8 formed by a channel plate 1 and a cover plate 6, while the nozzles are formed by irradiation with high-energy beams, for example with excimer laser beams, from the outer side of the ink cavity, so as to correspond to each ink cavity 8. The diameter of the formed nozzle is greater than the diameter of the inner part of the ink cavity irradiated with laser beams on the side of atmospheric air. In addition, while the formation of the nozzle 3 can be performed by connecting nozzle plate 2 to the end part of the ink cavity ahead of time, the nozzle diameter can be in this case greater on the side inside the cavity. However, since the formed nozzles must be connected to a corresponding ink cavity, alignment with a high precision necessitates a technique for formation of an adhesive layer so as prevent the nozzle from being filled at the time of the adhesion.

(0009)

Figure 4 shows one example of a conventional inkjet head created with a shape tapered toward the nozzle, wherein a member 1 of the channel plate, etc., is gradually tapered toward a nozzle 3 of a nozzle plate 2 to create a constricting part and a channel. Although ejection of air bubbles can be easily achieved because a restricting part 9 is deployed as shown in this figure, the molding of this restriction is very difficult.

(0010)

Figure 5 is a figure showing an example of prior art in which no restriction (restriction 9 in Figure 4) is created along the end part of a nozzle plate 2 on a channel plate member 1. In this case, an angular part 10 is created for channel plate 1 and nozzle plate 2 as shown in the figure. This angular part 10 can easily trap air bubbles received from the nozzle during the ejection of ink droplets and because it is very difficult to discharge an air bubble once it has been trapped, this is one reason why stability of the discharging of ink droplets is greatly reduced. In contrast to that, since according to the invention, the angular part has an angle filling part 7 as shown in Figure 1, air bubbles will not be trapped in the angular part as was the case in the conventional inkjet head shown above.

(0011)

Next, the molding method used for molding said angle filling member 8 will be explained. A head, provided with the shape of nozzles molded as shown in Figure 5 according to the above-explained procedure, is filled with a small amount of resin which has a low viscosity and hardens at normal temperature, supplied from the ink supply channel into the head ink cavity. Excessive resin is removed and in order to adjust the shape of the angle filling member, nitrogen, air and other gases flow from the ink supply channel. The amount of gases, from which excessive resin has been smoothly removed outside of the system, as well as the flow rate are adjusted so that a continuous gas flow can be continued while the shape of the angle filling member is maintained until the resin hardens after the expulsion. When this occurs, the corner filling member forms a streamline shape, which is an ideal shape for the ink flow. The formation time period can be also greatly reduced when heating is applied to promote hardening to the flow of the gas up to the vicinity of the resin hardening temperature (40 ~ 80°C).

(0012)

A two-component liquid epoxy resin hardening at normal temperature is a suitable resin for said low-viscosity thermosetting resin to be used for formation of said angle filling member. Taking into account also resistance to ink, epoxy resins used as epoxy phenol-based or nitrile phenol-based adhesive agents, acid anhydride-based products containing a hardening agent, or aromatic polyamine-based products are superior, although a curing temperature above 150°C is required in any case. If several materials are used to form the construction a head for suitable ink droplet ejection characteristics (for example when polyphenylene sulfide (PPS), or polycarbonate (PC) or the like is used for the ink channel plate, and PZT or a similar ceramic or silicon based

plate is used for the pressure generation member), there will be a difference in the linear thermal expansion coefficient.

[page 4]

It is therefore desirable to employ a processing method that does not involve application of a high temperature to the head. That is why it is desirable to use a chain-shaped fatty polyamine as a hardening agent that hardens at normal or medium temperature (about 80°C), or an adhesive that is based on a ring-shaped fatty polyamine, or a fatty aromatic polyamine. Such hardening agents have a relatively high amine value and a low viscosity even while hardening is still in progress when a small amount of the hardening agent used per the epoxy resin also before the hardening is completed, and they also tend to be resistant to swelling due to ink, when compared epoxy resins cured with a polyamide amine type of a hardening agent, which is another type of hardening agent that hardens at normal temperature.

(0013)

In order to create a highly integrated design of the inkjet head and to improve the ink droplet ejection characteristics, the diameter of the nozzle 3 formed in the nozzle plate 2 is less than 30 μm. However, when a finely detailed construction is required as explained above, it is difficult to form said angle filling member 7 in an ideal shape with the viscosity range (1,000 to several thousands cps) of the two-component liquid type of epoxy resin hardening at normal temperature. That is why approximately from 10 to 30% of a reactive diluent is added, such as butyl glycidyl ether (BGE, viscosity 1.5 cps/25°C), or styrene oxide (SO, viscosity 2 cps/25°C), phenyl glycidyl ether (PGE, viscosity 7 cps/20°C), or cresyl glycidyl ether (CGE, viscosity 6 cps/25°C), so that when the viscosity is greatly reduced (see Figure 3) and the excessive resin remaining inside the ink cavity as described above can be removed smoothly from the nozzles.

(0014)

According to another method that can be used for the formation of the angle filling member 7, the nozzle plate 2 is coated with a resin in a suitable thickness having adhesive characteristics, whose adhesiveness has been adjusted ahead of time to a relatively low level (for example the two-component liquid epoxy resin hardening at normal temperature mentioned above), so that the angle filling member is formed with a protruding adhesive resin together with the joining of the nozzle plate. However, since according to this method it is difficult to form the streamlined shape (Figure 1), which is an ideal shape for ejection of ink droplets, and after the joining of the nozzle plate, the diameter of the nozzle will be eventually greater on the side of external air than on the side of the ink cavity, when nozzle processing is performed for example with excimer laser. This shape has a detrimental influence on the stability of ejection of ink droplets. Moreover, it is also very difficult to eliminate fluctuations in the shape of the angle filling member between various nozzles when a multi-nozzle head is manufactured. Therefore,

the method for formation of the angle filling member can be selected so that the gas flow is iduced as described above.

(0015)

(Effect)

As is evident from the explanation above, the present invention has the following effects. Because in accordance with claim 1 of this invention, the invention provides an angle filling member which serves to eliminate angles in an angular part of the part joining an ink channel with a nozzle plate, this makes it possible to provide a highly reliable inkjet head characterized by a great degree of stability thanks to the fact that drawing in of air bubbles from the nozzle has been eliminated. In accordance with claim 2 of the invention, a streamlined type of shape is created for the shape of the angle filling part disclosed in claim 1, making it possible to provide an inkjet head enabling to achieve more efficiently the effect describe above. In accordance with claim 3 of this invention, the property used for the angle filling member disclosed in claim 1 and claim 2 is an epoxy-based resin, which facilitates the formation of the angular part. In accordance with claim 4 of this invention, when a high-temperature environment is not created during the formation of the angle filing part in the head construction, and a two-component liquid epoxy resin hardening at normal temperature (or medium temperature) is used in the epoxy-based resin disclosed in claim 3, it is not necessary to apply heating to a high temperature to a hardening type of material, making it possible to provide an inkjet head enabling to achieve more efficiently the effect described above. In accordance with claim 5, because the viscosity is reduced in resin used in the angle filling member which has not hardened yet, which is required to form the angle filling member with fine precision, namely the angle filling member disclosed in claim 1 and claim 2, a means is created enabling to attain this effect more efficiently. In accordance with claim 6 of the invention, since an ideal shape of the angle filling member disclosed in claim 1 and claim 5 is created, creating a manufacturing method enabling homogenous formation in a simple manner, the inkjet head can thus be manufactured so as to achieve this effect. In accordance with claim 7 of this invention, according to the angle filling member formation method disclosed in claim 6, the time period required until the formation of the member is reduced, creating an efficient means enabling to improve the quality.

(Brief Description of the Drawings)

(Figure 1)

The figure shows an enlarged cross-sectional view (in the longitudinal direction of the inkjet head channel) of the important parts of one embodiment of an inkjet head according to the present invention.

(Figure 2)

The figure is a perspective view showing one example of an inkjet head compatible with

this invention.

(Figure 3)

The figure shows one example of the viscosity reducing effect of a reactive diluent.

(Figure 4)

The figure shows an enlarged cross-sectional view of the nozzle part indicating one example of a conventional inkjet head.

(Figure 5)

The figure shows an enlarged cross-sectional enlarged view of the nozzle part in another example of a conventional inkjet head.

(Explanation of Symbols)

1 ... ink channel plate, 2 ... nozzle plate, 3 ... nozzle, 4 ... pressure generation member, 5 ... base plate, 6 ... cover plate, 7 ... angle filling member, 8 ... ink cavity, 9 ... constricting part, 10 ... angular part.

[page 5]

(Figure 1)

(Figure 2)

(Figure 3)

The effect of dilution in a representative example of a diluent
Base resin: Epikote 828

↑ Viscosity (poise at 25°C)
→ Diluent addition amount (wt %)

(Figure 4)

(Figure 5)

10. RELATED PROCEEDINGS APPENDIX

None presented.

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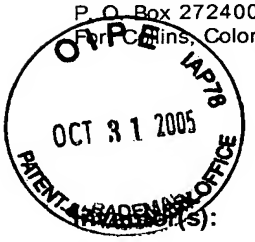
PATENT APPLICATION

ATTORNEY DOCKET NO. 200208191-1



IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Lawrence E Gibson et al

Confirmation No.: 1022

Application No.: 10/626252

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Filing Date: Jul 23, 2003

Group Art Unit: 1772

Title: Fluid Ejection Cartridge Utilizing A Two-Part Epoxy Adhesive

Mail Stop Appeal Brief-Patents
Commissioner For Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on **Aug 29, 2005**.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) $500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

( ) (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

( )	one month	$120.00
( )	two months	$450.00
( )	three months	$1020.00
( )	four months	$1590.00

( ) The extension fee has already been filled in this application.

(X) (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account **08-2025** the sum of **$500.00**. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

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